bad AB calculator M/C

day 89

84) 350° pizza taken out of oven. 75° room.

$\frac{dT}{dt} = -110e^{-0.4t}$ degrees F/min

what is temp of pizza at $t=5$?

Idea: Accumulate ALL the instantaneous rates of chg 0→5 [[def int]]

$T(5) = T(0) + \int_0^5 -110e^{-0.4t}\,dt \overset{\text{calc}}{=} 112.21^\circ$

$T(0) = 350^\circ$

to nearest degree $= 112^\circ F$

OR] $T(t) = \int -110e^{-0.4t}\,dt$

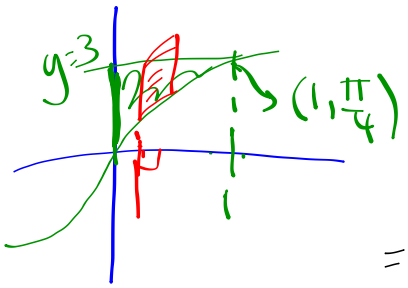
$= \frac{-110}{-0.4}\left(e^{-0.4t}\right) + C$

using $T(0)=350$ yields $T(5) = \frac{-110}{-0.4}e^{-0.4(5)} + \left(350 - \frac{110}{0.4}\right)$

day 89

Part B/86 base of a solid - in QI, bounded by $x=0$, $y=\tan^{-1}(x)$, $y=3$, $x=1$.

Each cross section perpendicular to x-axis is a square.



$$V=\int_0^1 \text{cross-sectional area}\,dx$$

$$=\int_0^1 (\text{side})^2\,dx=\int_0^1 \left(3-\tan^{-1}(x)\right)^2 dx$$

$$\overset{\text{CALC}}{=} 6.61233\ldots$$

day 89

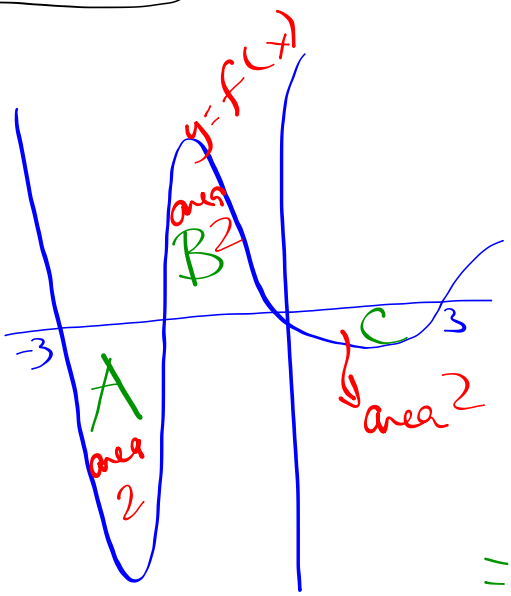
Part B/91 A particle moves along the x-axis so that, at any $t>0$, $a(t)=\ln(1+2^t)$

$v(1)=2$. $v(2)=?$

$$v(2)=v(1)+\int_1^2 v'(t)\,dt=2+\int_1^2 a(t)\,dt$$

$\approx 3.346313\ldots$

Part B/77)



Idea: definite integrals ARE Net Area

day 89

$$\int_{-3}^{3} (f(x)+1)\,dx$$

$$= \int_{-3}^{3} f(x)\,dx + \int_{-3}^{3} 1\,dx$$

$$= (-2+2-2) + (x|_{-3}^{3})$$

$$= -2+6 = 4$$

Feb 4-7:10 AM

day 89

Part B, #2) The rate of change of altitude of a hot-air balloon is given by $r(t) = t^3 - 4t^2 + 6$, $0 \le t \le 8$

what is chg of altitude when alt. is decreasing

altitude decreasing $\Rightarrow \frac{d(Alt)}{dt} < 0 \Rightarrow r(t) < 0$

But can't solve, so determine from graph;

graph: 2nd calc zero: $x = 1.5719933$

2nd calc zero: $x = 3.5141369$

So total chg in altitude $= \int_{1.5719}^{3.5141} r(t)\,dt$

Feb 4-7:10 AM

day 89

Part B, 80| The f^n f is continuous x∈[-2,1] and differentiable x∈(-2,1) f(-2)=-5; f(1)=4. Which is FALSE.

A) there exists c, -2<c<1, with f(c)=0 true, IVT

B) there exists c, -2<c<1, with f'(c)=0 FALSE (or not the definitely)

C) there exists c, -2<c<1, with f(c)=3 true, IVT

D) there exists c, -2<c<1, with f'(c)=3 true, MVT

E) there exists c, -2≤c≤1, with f(c)≥f(x) for every x -2≤x≤1 true, extreme value theorem

work for MVT $\frac{4-(-5)}{1-(-2)}=\frac{9}{3}=3$